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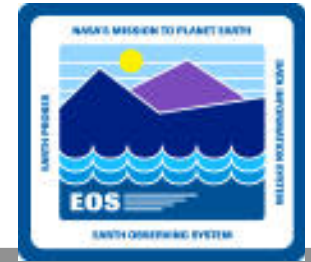
# Functional Overview

## Debbie Dunn

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2 September 1997

# FOS RRR Roadmap



## Overview Material

### FOS Overview

- RRR Objectives
- FOS Status & Schedule

### FOS CSR Action Items

- CSR Action Item Status

### Functional Overview

- List of FOS capabilities

## FOS Acceptance Test Status

### Acceptance Test Status

- Test Results
- Technical Liens & Issues
- External Interface Test Status

## FOS Audits

### Audit Results

- Physical Cfg Audit (PCA)
- Functional Cfg Audit (FCA)

## FOS Next Steps

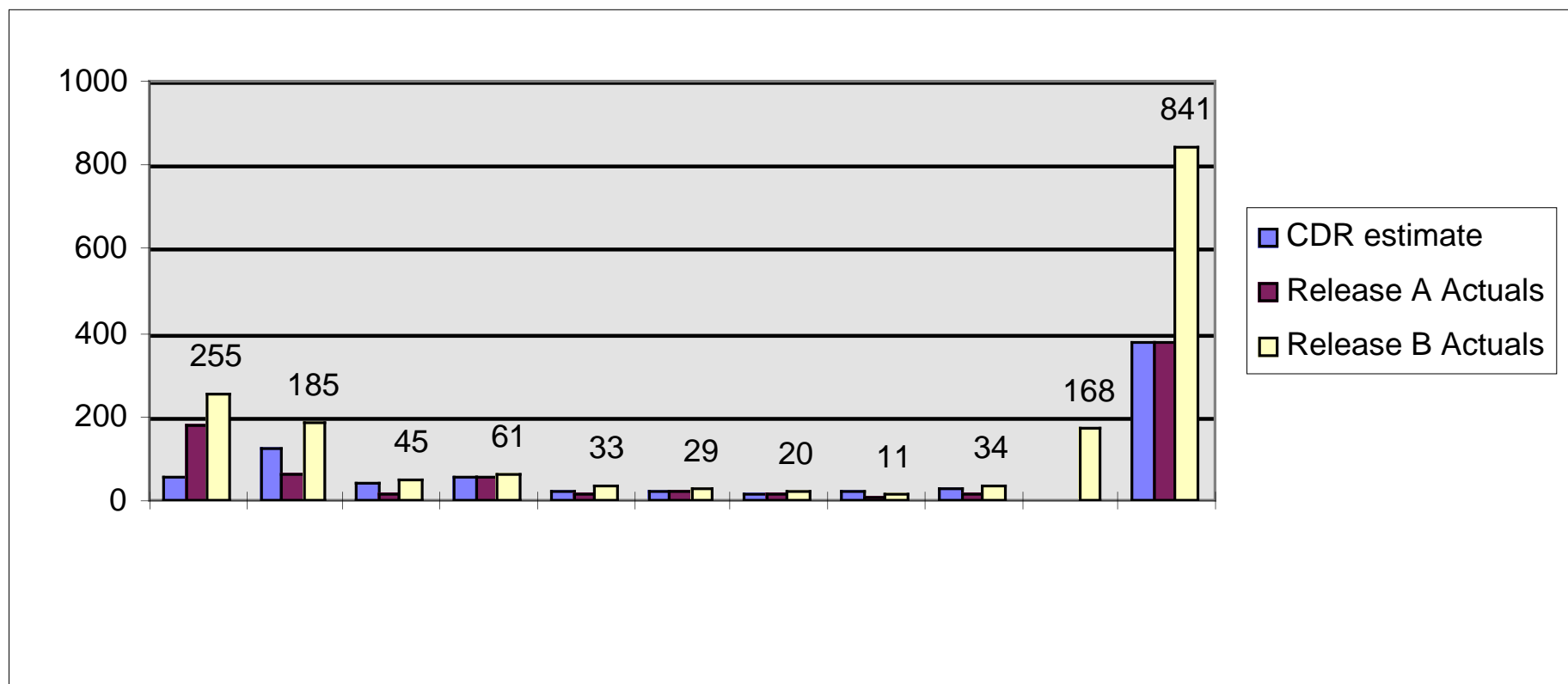
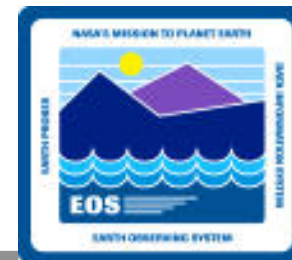
### Post-Acceptance Test Plan

- External Engineering Tests
- IST Delivery
- FOT Plans

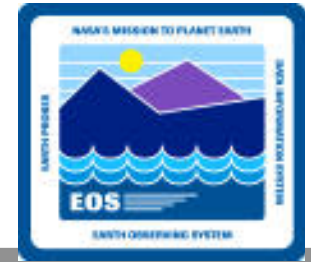
### Post-B Development/ Sustaining Engineering/

- Approach
- Schedule

# FOS KLOC Summary

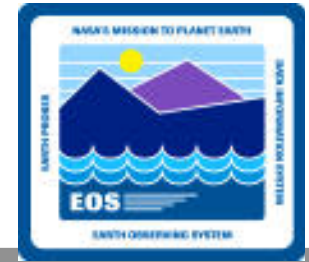


# FOS Release B Functionality/Issues



- 4 **System**
- 4 **Planning & Scheduling**
- 4 **Command Management**
- 4 **Resource Management**
- 4 **Telemetry**
- 4 **Command**
- 4 **Real-Time Contact Management**
- 4 **Analysis**
- 4 **User Interface**

# System Functionality (1 of 2)



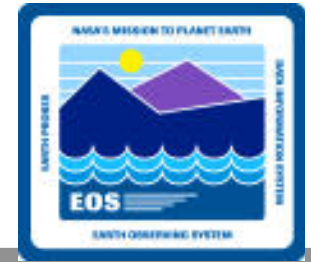
## System Configuration

- Data Server Startup/Shutdown
- Data Server Failover
- Real-Time Server Startup/Shutdown
- User Station Startup/Shutdown

## Database

- Project Database Ingest and Validation
- Operational Database Generation
- Database Reporting
- Database Backup & Restore (TBD)

# System Functionality (2 of 2)



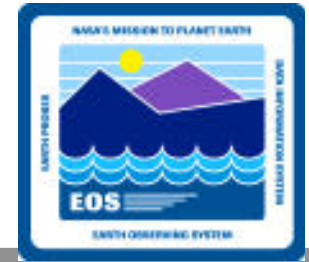
## Events

- Event Message Display
- Event Message Filtering
- Event History
- Alarm Processing

## IST

- IST Startup/Shutdown
- Planning and Scheduling
- Telemetry
- Events

# System Functional Issues



## System Configuration

- Real-time Server and Data Server on the DEC's

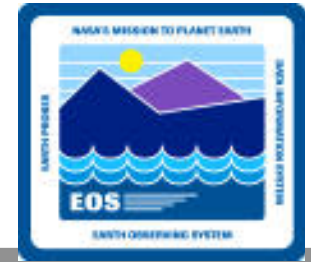
## Database

- Database Backup & Restore

## IST

- HP IST checkout
- Command Management
- Analysis
- IST Pool Management

# Planning & Scheduling Functionality (1 of 4)



## Activity Definition

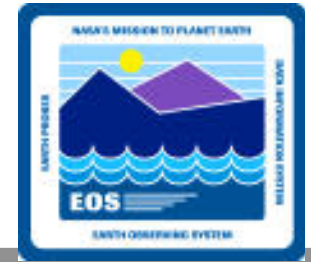
- Create modify and delete spacecraft or instrument activities
- Supports ATC Commands, ECL directives and modes
- Establishes relative time off-sets and parameters
- Authorized access to activities

## BAP Definition

- Create, modify and delete spacecraft or instrument Baseline Activity Profiles
- Establishes periodicity for activities by events or time frequency
- Authorized access to BAPs



# Planning & Scheduling Functionality (2 of 4)



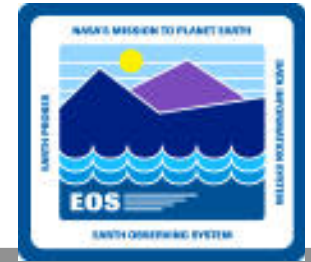
## Constraint Definition

- Create, modify and delete spacecraft and instrument constraint definitions
- Support for “hard” and “soft” constraints

## Activity Scheduling

- Schedule activities, BAPs, commands and procedures against mission plans
- Supports impact, non-impact and over-subscribe modes
- Remove and modify scheduled activities
- Support for late changes

# Planning & Scheduling Functionality (3 of 4)



## Timeline Management

- Display activities, modes and events with associated information
- Management of multiple plans
- Display mission consumables, such as power and data volume
- Identify “hard” and “soft” constraint violations
- MISR Local Mode Tool
- CERES Events

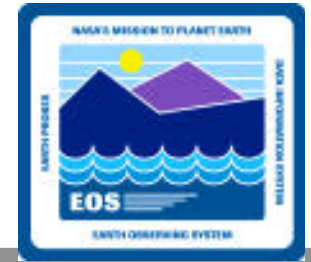
## What-If

- Create what-if plans on the timeline

## ASTER I/F Filter

- Receive one-day and short-term schedule and integrate into master mission plan
- Send ASTER preliminary resource schedule

# Planning & Scheduling Functionality (4 of 4)



## Planning Aids Management

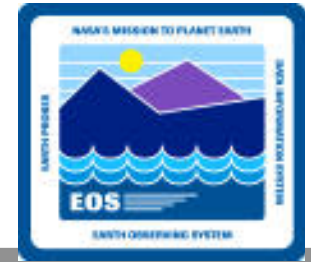
- Receive planning aids from FDF
- Populate orbital event pool

## TDRSS Scheduling

- Create contact activities and schedule on mission schedule
- Support for both TDRSS and Ground Contact activities

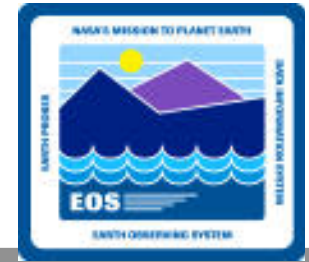
# Planning & Scheduling Functional Issues

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None

# Command Management Functionality (1 of 4)



## ATC Load Generation

- Generate ATC loads from Detailed Activity Schedule
- Perform command level constraint checking on ATC loads
- Partition ATC loads for uplink to spacecraft
- Generate ATC Load Report for each ATC load generated

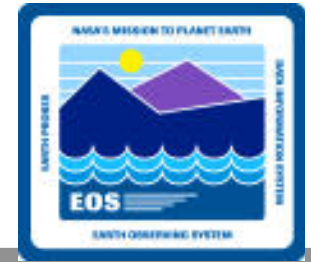
## RTS Load Generation

- Generate RTS load contents from user input
- Accept RTS load contents from valid external I/F
- Generate RTS loads from load contents
- Generate RTS Load Report for each RTS load generated

## Table Load Generation

- Build table load contents from user input and table definitions in PDB
- Generate table loads from valid table load contents
- Generate table Load Report for each table load generated

# Command Management Functionality (2 of 4)



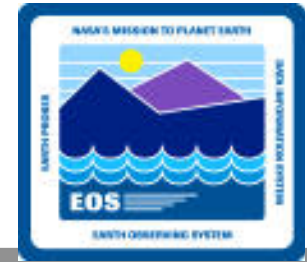
## Microprocessor Loads

- Accept and validate microprocessor load contents
- Generate microprocessor loads from microprocessor load contents
- Generate Microprocessor Load Reports

## Flight Software Loads

- Accept and validate flight software load contents
- Generate flight software loads from flight software load contents
- Generate Flight Software Load Reports

# Command Management Functionality (3 of 4)



## ATC Load Management

- Maintain a reference image of the contents of the ATC buffer
- Update reference image when ATC loads successfully uplinked
- Generate Memory Map Reports

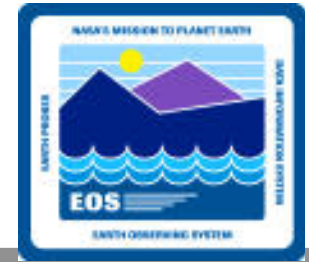
## RTS Load Management

- Maintain catalog of RTS loads available for uplink
- Generate RTS Catalog Report
- Maintain RTS memory map
- Generate RTS Memory Map Report

## Table Load Management

- Maintain catalog of table loads available for uplink
- Generate Table Catalog Report specifying available loads
- Generate Table Map Report specifying load contents currently loaded

# Command Management Functionality (4 of 4)



## Ground Script Generation

- **Generate ground scripts based upon Detailed Activity Schedule**
- **Perform constraint checking of ground directives**
- **Include as comments spacecraft commands scheduled to execute**

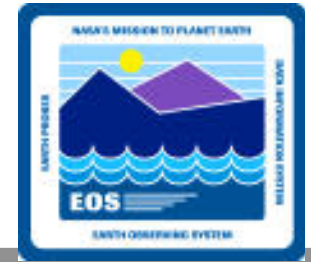
## Memory Management

- **Maintain a ground reference image of spacecraft memory**
- **Create memory dump image from collected dump data**
- **Perform dump compare and report all discrepancies**



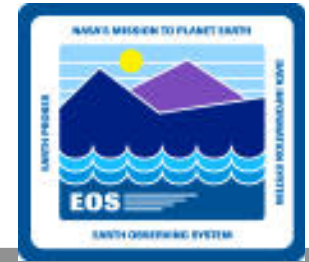
# Command Management Functional Issues

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None

# Resource Management Functionality (1 of 2)



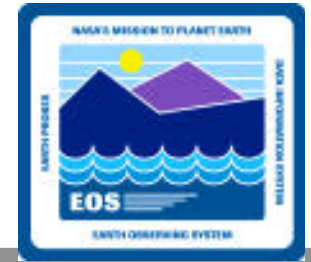
## String Configuration

- **Create Logical Strings (default logical strings/ operator requested logical strings)**
- **Connect to Logical Strings/Disconnect from Logical Strings**
- **Delete Logical Strings**
- **String Failover**

## Command Authority

- **Take/Switch Command Authority**
- **Validate User and Workstation for Command Authority**
- **Deny Command Authority for unauthorized User or Workstation**

# Resource Management Functionality (2 of 2)



## Ground Control Privilege

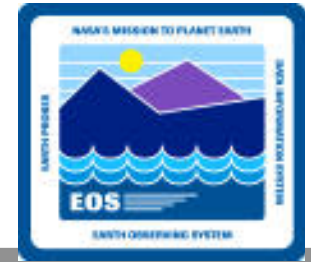
- Take/Switch Ground Control
- Validate User and Workstation for Ground Control
- Deny Ground Control for unauthorized User or Workstation

## Resource Monitoring

- Monitor of Software Components in the EOC
- Data Server Failover

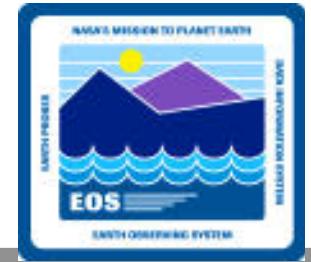
# Resource Management Functional Issues

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None

# Telemetry Functionality (1 of 2)



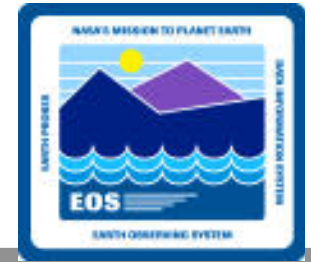
## Decom

- Housekeeping (16 Kbps)
- Health & Safety (1 Kbps)
- Diagnostic (1Kbps)
- Processing of duplicate CERES Housekeeping data
- EU Conversions
- Red/Yellow Limits
- Delta Limits
- Data Dropout Detection

## Archive

- Real-Time Telemetry
- Receipt of Rate-buffered Telemetry

# Telemetry Functionality (2 of 2)



## Replay

- Dedicated Replay

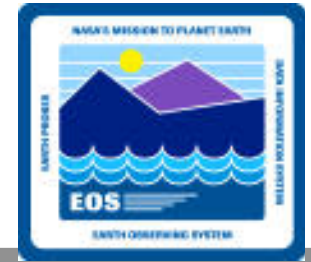
## Configuration

- Selective Decom
- Limits adjustments
- EU coefficient adjustments

## Spacecraft State Check

## Memory Dump Processing

# Telemetry Functional Issues



## Decom

- Context Dependent Telemetry
- Derived Parameters

## Archive

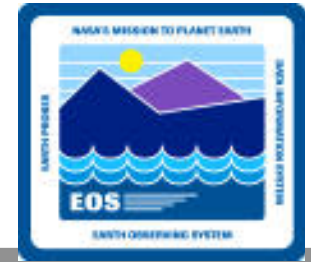
- Merge
- Long-term Archive

## Replay

- Shared Replay

## Info Window

# Command Functionality (1 of 2)

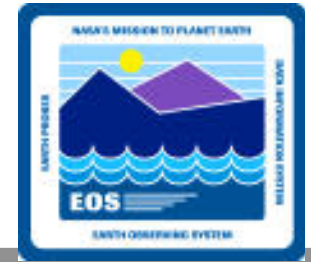


## Real-Time Commanding

- **Command Generation and Validation**
- **Command Submnemonic processing**
- **Command Uplink**
- **Prerequisite State Checking and Override**
- **Critical Command Allow/Cancel**
- **Hazardous Command Processing**
- **Receipt Verification**
- **CCSDS COP-1 Command Retransmission**
- **Execution Verification (Real-Time and Stored Commands)**



# Command Functionality (2 of 2)



## Command Configuration

- Supports all required uplink rates (125bps, 1kbps, 2kbps, 10kbps)
- CCSDS FOP Configuration

## Automated Commanding

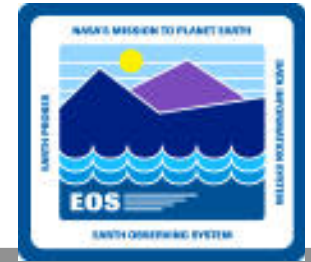
- Ground Script Commanding
- Procedure Definition and Execution

## Load Processing

- Uplink of ATC, RTS, and Table Loads

# Command Functional Issues

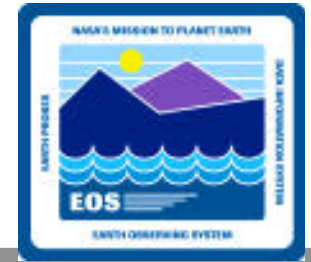
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## Command Request Processing

# Real-Time Contact Management Functionality

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## NCC Interface

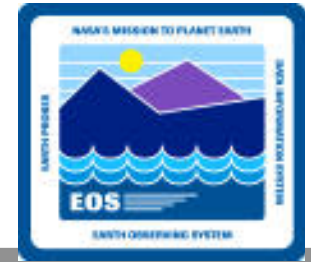
- GCMR Processing
- UPD Processing and Display
- UPD Archive

## EDOS Interface

- CODA Processing and Display
- CODA Archive

# Real-Time Contact Management Functional Issues

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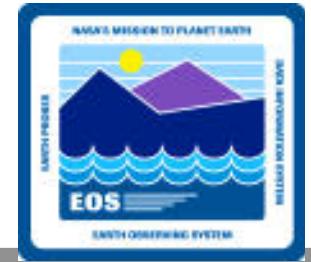
## NCC Interface

- UPD Replay and Analysis

## EDOS Interface

- CODA Replay and Analysis
- SCS Summary Report

# Analysis Functionality (1 of 3)



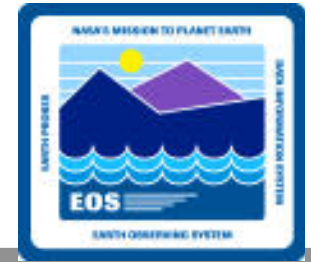
## Dataset Generation

- **Generate datasets for archived spacecraft telemetry data in both raw and EU values**
- **Generate datasets for user specified statistical data**
- **Generate datasets in carryout format**
- **Generate datasets utilizing the appropriate PDB for the requested time interval**

## User Selectable Statistics

- **Generate user requested data products of statistical data, including:**
  - **MMM data**
  - **Standard deviations**
  - **Numbers of samples**

# Analysis Functionality (2 of 3)



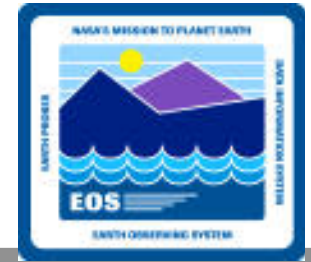
## Spacecraft Activity Log

- **Monitors R/T telemetry and reports entries into the spacecraft activity log**
- **Performs dump collection and formatting of the spacecraft activity log data**
- **Analyzes dump data and reports new entries**

## Decision Support System

- **Infrastructure integrated into the system**
  - **RTWorks based**
- **3 applications provided**
  - **Monitor telemetry quality using CODA, UPD, and HK tlm data**
  - **Detect and recognize ACE and SAD misconfigurations**
  - **Command decoder anomalies**

# Analysis Functionality (3 of 3)



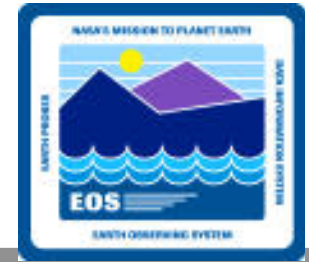
## SSR Management Tool

- **Creates SSR playback requests prior to each contact session based upon predicts**
- **Monitors and displays SSR record and playback counters**
- **Evaluates CODA and UPD data to determine downlink status of SSR playbacks**
- **Provides SSR buffer volume updates to models following contact session**

# Analysis

## Functional Issues (1 of 2)

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### Dataset Display

### System Statistics

- System generated telemetry statistics
- FDF statistics

### Reports

- Time Ordered Downlink Report
- Parameter Out-of-Limits Report

### Spacecraft Clock Correlation

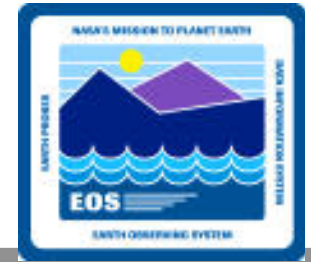
- RDD method
- USCCS method



# Analysis

## Functional Issues (2 of 2)

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### Standing Orders

- Standing order browser
- End to end processing

### Special Processing Algorithms

### EDOS/NCC Statistics

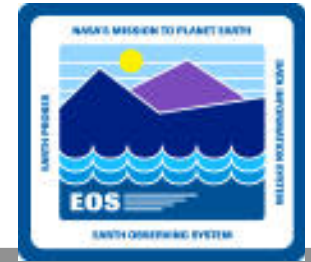
### User Algorithms

- Dataset generation using user supplied algorithms

# User Interface Functionality

## (1 of 4)

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### Directive Processing

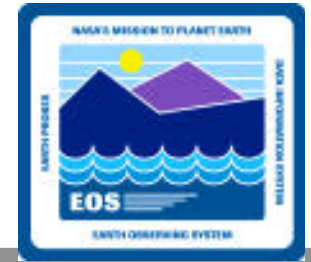
- Syntax checking
- Directive execution

### Screen Management

- Control window capability
  - Directive entry/editing/execution
  - 3 line event display
  - Tool access
  - Help access
- Window and room management

# User Interface Functionality

## (2 of 4)



### Displays

- Alphanumeric, Tables, and Graph Displays
- Schematic Displays

### User Customization

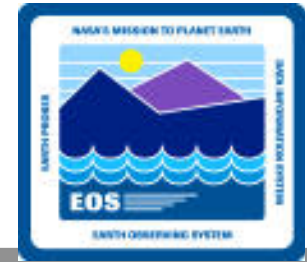
- Define color schema, fonts, default directories and printers

### Procedures

- Create, update and save procedures
- Execute and control procedures

# User Interface Functionality

## (3 of 4)



### Data Mover

- Transfer files from local to system directories
- Transfer files from system to local directories
- Delete files from local directories

### OASIS/CSTOL Conversion

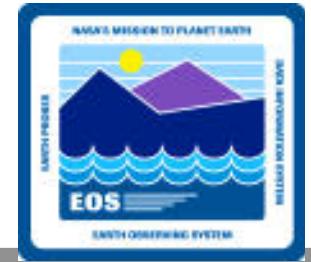
- Convert AM-1 CSTOL procedures to ECL
- Flag conversion incompatibilities

### User Authentication

- Authenticate user login
- Provide selection of user role
- Add, modify, delete users from system

# User Interface Functionality

## (4 of 4)



### Document Reader

- Browse on-line documentation

### Email

- Create, save, send, delete email messages

### Quick Message Generator

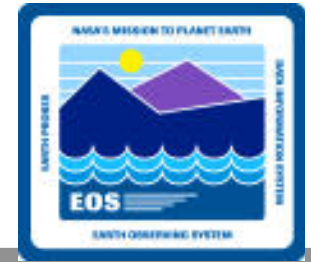
- Send messages to events display

### On-Line Help

- Access to on-line help documentation

# User Interface Functional Issues

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## Custom Reports